

Applicants: Wieland *et al.*

Serial No.: 09/853,902

Filed: May 14, 2001

Amendment and Response to Non-Final Office Action (August 9, 2005)

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### **REMARKS**

The present application has claims 1-16 pending. Applicants have herein amended claim 1 to clarify that the catalyst is a single catalyst and that the support material may include titanium oxide. Support for these amendments may be found throughout the application, and specifically at paragraphs [0012] and [0013] of the published application. No new matter is added by the amendments.

In the Office Action dated February 9, 2005, the Examiner rejects claims 1 – 16 under 35 U.S.C. § 103(a) as unpatentable over WO 99/64150 (Fukunaga) in view of Klein *et al.*, and further in view of McShea, *et al.* or Hwang, *et al.* or Kobylinski.

For at least the reasons provided below, Applicants respectfully disagree with the Examiner's position. Applicant's maintain that Fukunaga, Klein and the cited secondary references do not, either alone or in combination, teach, disclose or otherwise suggest the claimed invention. Moreover, even if the cited references when combined were to teach, disclose or otherwise suggest the claimed invention (which they do not), there would be no motivation to combine those references in order to produce the claimed invention.

First, the Examiner asserts that it would be obvious to use the catalyst from Klein, *et al.* in the process of Fukunaga. Applicants disagree. The critical aspect of Fukunaga is that the catalyst contains both ruthenium and zirconia. Fukunaga repeatedly asserts that his invention requires the combination of ruthenium and zirconia and that the interaction between these two elements provides unique catalytic activity which is the basis for the invention. See, e.g., col. 5, lines 48-58 of the corresponding U.S. patent, U.S. Patent No. 6,749,828.

The Fukunaga patent itself, therefore, teaches away from changing the catalyst that is employed therein, since doing so would eliminate the precise aspects which are alleged to be inventive. Thus, there is no incentive or motivation to use the catalyst of Klein, *et al.* in the process of Fukunaga as maintained by the Examiner. Applicants

submit that the Examiner has not pointed to a sufficient motivation to combine the cited references and that no such motivation exists.

Moreover, even if one skilled in the art would combine these references, at best a ruthenium/zirconia catalyst on a support material would result. Again, there would be no motivation for removing ruthenium or zirconia from the catalyst employed by Fukunaga or for substituting other metals or oxides into the catalyst.

Accordingly, the combination of Fukunaga and Klein, *et al.*, even if proper, would not provide the invention of claim 1 of the present application since neither ruthenium nor zirconia is required in the present invention. Moreover, Fukunaga teaches away from the use of other platinum group metals useful in the present invention because such metals would not have the “unique catalytic activity” attributed to the interaction of ruthenium and zirconia. Thus, dependent claims of the present invention, such as claims 3-16, which require rhodium and/or platinum are not disclosed or suggested by Fukunaga, alone or in combination with Klein, *et al.*

Also it should be noted that the present invention provides a system for obtaining hydrogen on board a motor vehicle (see, for instance, page 5, lines 17-19). Advantages of the present invention include a very high hydrogen productivity making the invention particularly well suited for mobile applications (see e.g., page 3, lines 13-15). In addition, the present invention achieves its objective in a simple one-step process in which the preheated reactant mixture is “passed over” a single catalyst which is able to provide the energy required for the endothermic steam reforming in the point of entry region of the catalyst (see, e.g., page 3, lines 16-22).

In contrast, the system of Fukunaga is intended as an industrial scale application. See, e.g., the discussion of the problems being addressed by the Fukunaga invention in the Background section of the patent, col.1, lines 26-39; see also the discussion of the

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reactors in which the Fukunaga process is practiced, col. 13, lines 21-25 (fixed-bed, moving-bed, or fluidized-bed reactors).

The remaining references relied on by the Examiner as a basis for rejection are cited to provide the preheating step missing from Fukunaga. None of these references, however, provide the missing aspects of the present invention discussed above. Additionally, none of these references can properly be combined with Fukunaga since they all involve multi-step processes using multiple catalysts, rather than a single catalyst in a one-step process as set forth in the present application.

Since none of the cited references disclose, teach or suggest the present claims that include preheating the reactant mixture and passing it over a single catalyst adiabatically, and since none of the references disclose the catalyst requirements set forth in the independent claims and particularly in the dependent claims of the present application, then the invention as presently claimed cannot be considered obvious. Moreover, there is no motivation to combine the references in such a way to obtain the claimed invention. Therefore, it is respectfully submitted that an obvious rejection under 35 U.S.C. §103(a) is improper.

In view of the amendments and remarks set forth above, reconsideration of the rejections set forth in the February 9, 2005 Office Action and allowance of the present application are respectfully solicited.

Enclosed is a check in the amount of \$1,020.00, the required fee for the three month extension of time. No additional fee is believed to be due with respect to the filing of this response. If any additional fees are due, or overpayment has been made, please charge, or credit, Deposit No. 11-0171 for such sum.

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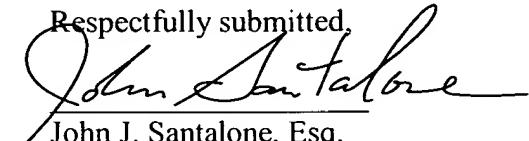
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If the Examiner has any questions regarding the present application, the Examiner is cordially invited to contact Applicants' attorney at the telephone number provided below.

Respectfully submitted,



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